

Application No.: 09/826,036

Docket N .: 21806-00115-US

REMARKS/ARGUMENTS

Bearing mind the comments in the final Official Action and the amendments and arguments presented in this amendment, the application is believed to be in condition for allowance. An early indication of the same would be appreciated.

Claims 1, 2, 4-8, 10, 15, and 21-27 remain pending in this application. Claim 1 is independent. Claims 1 and 4 have been amended, and claims 16-20 have been canceled by this amendment. No new matter or new issue is believed to be implicated by the amendments to the claims.

Further to the previously imposed restriction requirement, claims 16-20 have been canceled without prejudice or disclaimer to their subsequent filing in a Divisional Application.

Withdrawal of the rejection of claim 4 under 35 U.S.C. §112, second paragraph, as being indefinite, is requested. The dependency of claim 4 has been corrected to properly depend from claim 1, as suggested by the Examiner.

Withdrawal of the rejection of claims 1, 2, 4-8, 10, 15, and 21-27 under 35 U.S.C. §103(a) as being unpatentable over Desai et al. (US 6,303,480) in view of Part (US 6,281,118) is requested. Not only does the suggested combination not teach or suggest all the claimed limitations, the references are submitted as not being properly combinable due to improper motivation to combine, as discussed below.

At the outset, Applicant notes that, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference must teach or suggest all the claim

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limitations.¹ Further, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure.²

An essential evidentiary component of an obviousness rejection is a teaching or suggestion or motivation to combine the prior art references.³ Combining prior art references without evidence of a suggestion, teaching or motivation simply takes the inventors' disclosure as a blueprint for piecing together the prior art to defeat patentability – the essence of hindsight.⁴

"There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art."⁵ Further with regard to the level of skill of practitioners in the art, there is nothing in the statutes or the case law which makes "that which is within the capabilities of one skilled in the art" synonymous with obviousness.⁶ The level of skill in the art cannot be relied upon to provide the suggestion to combine references.⁷

The applied art, taken alone or in combination, does not teach or suggest a method of filling an opening in an oxide layer, over a liner layer formed on a surface of a silicide substrate underlying both the oxide layer and the liner layer, which includes, among other features, **"...forming a first continuous layer comprising silicon...at a first temperature in the range 500°C to 650°C completely covering the oxide layer and the liner layer; and forming a second layer comprising a refractory material on the first layer at a second temperature that is lower than the first temperature...wherein said second temperature is selected to avoid any significant reaction between the refractory material and the silicon in the first continuous layer"**, as recited in independent claim 1, as amended.

¹ See MPEP §2143.

² *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) and *See* MPEP §2143.

³ *C.R. Bard, Inc. v. M3 Systems, Inc.*, 48 USPQ2d 1225 (Fed. Cir. 1998)

⁴ *Interconnect Planning Corp. v. Fell*, 227 USPQ 543 (Fed. Cir. 1985)

⁵ *See* MPEP §2143.01, citing *In re Rouffet*, 149 F.3d, 1350, 1357, 47 USPQ2d 1453, 1457-8 (Fed. Cir. 1998).

⁶ *Ex parte Gerlach and Woerner*, 212 USPQ 471 (PTO Bd. App. 1980).

⁷ *See* MPEP §2143.01, citing *Al-Site Corp. v. VSI Int'l Inc.*, 50 USPQ2d 1161 (Fed. Cir. 1999).

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Desai et al. does not teach or suggest forming a *continuous layer of silicon completely covering* the oxide and liner layers. The silicon layer of Desai et al. is *only* on the sidewalls of the contact hole, and does not completely cover *both* the oxide and liner layers of Desai et al.

Desai et al. is admitted as being deficient by the Examiner in disclosing the invention recited in the pending claims insofar as "...the temperature of the CVD process for depositing the conductive contact is not discussed, the silicon being a polysilicon film is not discussed and the temperature for CVD of the layers is not discussed."⁸

The Examiner offers Park as making up for the deficiencies of Desai et al. by the assertion that it would have been obvious to modify Desai et al. by Park's utilization of polysilicon and certain deposition temperatures. The motivation to make such modification was stated as being that depositing polysilicon allows for stabilizing a contact interface, and that utilizing Park's disclosed temperature ranges during CVD allows for deposition of the layers. These asserted bases for motivation to modify Desai et al. by Park are submitted as being facially deficient, as Park teaches away from at least one aspect of Applicants' invention, as discussed below.

Park teaches away from at least one aspect of the claimed invention, in that Park teaches the desirability of reacting the refractory material with the silicon material. Park sets out to intentionally react tungsten (W) with silicon (Si) to form WSi_x , whereas Applicants' Specification specifically discusses such reaction as a known conventional problem, and further discusses the undesirability of such reactions.

In this respect, Applicants invention uses and claims the lower temperature of deposition of the refractory material to ensure that such reaction does not occur.

Therefore, Applicants submit that person having skill in the art would not be motivated to combine Desai et al. with Park in the manner suggested by the Examiner to solve Applicants' stated problems.

⁸ See Final Official Action at p. 6, first full paragraph.

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As for the Examiner's statements concerning the deposition temperature of W, and considering that Park may disclose a range of temperatures for deposition, Park fails to overcome the above-discussed deficiencies of Desai with respect to rendering obvious the present invention. In particular, Park does not disclose that a refractory metal layer is to be deposited at a temperature lower than temperature used for depositing a silicon layer. Park merely provides temperature ranges that *can be* employed for both the silicon layer and metal silicide layer, which temperatures overlap each other. Accordingly, the temperature employed for the silicide layer *could be* the same as, lower than, or higher than the temperature employed to provide the silicon layer.

Furthermore, it would not be apparent to employ the temperature range performing the silicon layer in Park, since such layer has a thickness significantly greater than the mono layer of Si *required by* Desai et al..

The mere fact that cited art *may be* modified in the manner suggested by the Examiner does not make this modification obvious, unless the cited art suggest the desirability of the modification.⁹ No such suggestion appears in the cited art in this matter.

In *Dembiczak et al.*, the Court at 1617 stated: "Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references. See, e.g., *C.R. Bard, Inc., v. M3 Sys., Inc.*, 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed. Cir. 1998) (describing 'teaching or suggestion motivation [to combine]' as in 'essential evidentiary component of an obviousness holding'), *In re Rouffet*, 149 F. 3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed. Cir. 1988) ('the Board must identify specifically... the reason one of ordinary skill in the art would have been motivated to select the references and combining them');..."

⁹ See *In re Lee* 61 USPQ2d 1430 (Fed. Cir. 2002), *In re Dembiczak et al.* 50 USPQ2d 1614 (Fed. Cir. 1999), *In re Gordon*, 221 USPQ 1125 (Fed. Cir. 1984), *In re Laskowski*, 10 USPQ2d 1397 (Fed. Cir. 1989), and *In re Fritch*, 23, USPQ2d 1780 (Fed. Cir. 1992).

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Also, the cited art lacks the necessary direction or incentive to those of ordinary skill in the art to render the rejections under 35 U.S.C. §103 sustainable. The cited art fails to provide the degree of predictability of success of achieving the properties attainable by the claimed invention needed to sustain a rejection under 35 U.S.C. 103.¹⁰

Finally, Applicants point out that, as would be known to a person having skill in the art, depositing the refractory material at a lower temperature slows the deposition rate, to reduce the formation of gaps or seams in the deposited layer, and also reduces the reaction of W with Si to form WSi_x , for example. Such formation is specifically disfavored in the disclosed and claimed invention, as discussed above.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims, and to pass this application to issue.

The Examiner is respectfully requested to enter this Amendment After Final, in that it raises no new issues, but merely places the claims in a form more clearly patentable over the references of record.

In the alternative, the Examiner is respectfully requested to enter this Amendment After Final in that it reduces the issues for appeal.

¹⁰ See *Diversitech Corp. v. Century Steps, Inc.* 7 USPQ2d 1315 (Fed. Cir. 1988), *In re Mercier*, 185 USPQ 774 (CCPA 1975), and *In re Naylor*, 152 USPQ 106 (CCPA 1966).

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The Director is hereby authorized to charge any fees, or credit any overpayment, associated with this communication, including any extension fees, to CBLH Deposit Account No. 22-0185.

Respectfully submitted,

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